Overcoming Bias in the Madison River NRC Process

Bullet Points

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The Madison River Negotiated Rulemaking Committee (NRC) was provided materials from Montana Fish, Wildlife & Parks (FWP) as background materials such that they can make informed management decisions on a new Madison River Recreation Plan.

STUDIES

Summary of findings from the Madison River on-site survey, Summer 2009.

The Madison River on-site survey was conducted through the summer of 2009 (June 18 – August 30). The survey focused on the 140-mile stretch of the Madison between Hebgen Dam and Three Forks. This was further divided into Upper, Raynolds Pass to Lyons Bridge; Middle, Lyons Bridge to Valley Garden; and the Lower, mouth of Bear Trap Canyon to Greycliff.

Water-based recreationists were interviewed at access sites. A total of 570 surveys were conducted, 188 on the Upper, 181 on the Middle, and 201 on the Lower.

- FWP often presents their data not as number of total respondents but as a percentage of respondents.
- FWP often in their interpretation of results will present breakdown percentages of respondents and breakdown percentages of percentages of respondents. For example, on page 4, the bottom chart, FWP presents: Did anything NEGATIVELY IMPACT the quality of your recreational experience while visiting the river today? They present results for Stretch 1 (n = 187) as 85.6% NO and 14.4% YES. Then, on page 5, they ask: If yes, what ONE THING most negatively impacted the quality of your experience? They present results for Stretch 1 (n=27) as percentages, but do not present the number of people, Too many people, 18.5%; Didn't catch enough fish, 14.8%; Lack of etiquette, 11.1%, and Too many boats, 7.4%. **The number of people giving specific negative responses in Stretch 1 was only 5, 4, 3, and 2 people.**

In the Discussion section of this "study", FWP and BLM grossly misrepresent their own results. For example, the second paragraph of the Discussion states:

> "Respondents rated some of the conditions on Stretch 1 as unacceptable. In particular, the number of people (and vehicles) at the river access sites, the number of people float fishing the river, the number of people bank/wade fishing the river, and the overall number of people fishing the river were rated slightly lower than other conditions."

- Reading this sentence on its own suggest strongly that people on Stretch 1 feel conditions are unacceptable. **However, if we look at the actual number of people responding to those conditions as unacceptable a different inference can be made as only 22 people, 21 people, 21 people, and 17 people, respectively responded that those conditions were unacceptable.**

- **Further, for those same conditions (but not reported in text), 59.6% or 112 people, 70.0% or 131 people, 70.0% or 131 people, and 71.4% or 134 people, respectively, responded that those conditions were very acceptable or acceptable.**

"Stretch 3 also for the following conditions: the number of people (and vehicles) at the river access sites, the amount of litter in the river and along the banks and shorelines, and the amount of litter at the river access sites." Similarly, reading this sentence on its own suggest strongly also that people on Stretch 3 feel conditions are unacceptable.

- **If we look at the percentage and actual number of people responding to those conditions as unacceptable a different inference can be made as only 24 people, 28 people, and 21 people, respectively responded that those conditions were unacceptable.**
- **Again, for those same conditions, 74.7% or 150 people, 77.3% or 155 people, and 82.3% or 165 people, respectively, responded that those conditions were very acceptable or acceptable.**

Research summary: Selected findings from a 2009 Madison River onsite visitor survey, December, 2009.

- This exact same study is presented to us again by FWP under a different title and format. None of the data were changed, simply the presentation.

2008 Survey of property owners concerning the Madison River, Fact sheet. April 2009.

This fact sheet provided selected results from a 2008 survey of property owners along the Madison River. All private landowners that owned property touching the Madison River were sent mail-back return surveys regarding the section of river where they own property.

The river was divided into sections, Hebgen Dam to Lyon's Bridge; Lyon's Bridge to Ennis Dam; and, Ennis Dam to Three Forks. For Section 1, 60 landowners were identified and sent surveys. A total of 38 landowners responded, 63% response rate. For Section 2, 61 landowners were identified and 43 landowners responded, 70% response rate. For Section 3, 20 landowners were identified and 12 landowners responded, 60% response rate. For all Sections, 141 landowners had property touching the Madison River and 93 (66%) landowners responded to the survey.

For section 1, the report states that the most frequently mentioned comments included concerns about: increasing use, number of floaters, number of bank/wade anglers, too much fishing pressure … becoming too crowded, trespassing, efforts to establish river setbacks, increasing development, number of out-of-state river guides/outfitters, more law enforcement, and, about noxious weeds.

- **In the above reported responses, not a single enumeration was provided.**

For section 2, the report states that the most frequently mentioned comments included concerns about: number of out-of-state river guides/outfitters, high number of floaters at certain times of the year, trespassing, and, more law enforcement.

- **Again, in the above reported responses, not a single enumeration was provided.**

For section 3, the report states that the most frequently mentioned comments included concerns about: trespass, illegal hunting, and, high recreational use at certain times of the year is hard on the fishery.

- **Again, in the above reported responses, not a single enumeration was provided.**

Results from the 2008 Survey of Montana resident anglers concerning the Madison River, April 2009.

FWP conducted a survey of Montana resident anglers concerning the Madison River. The focus of the survey was stretch of Madison River between Hebgen Dam and Three Forks. The purpose of the survey was to assess resident angler satisfaction with social and resource conditions on the Madison river and how this might influence their decision to use the river.

Table 1 for this report tabulates response to "What was your primary reason for NOT fishing this stretch of the Madison River or spending what you consider to be a significantly less amount of time fishing there during the last 3 years?"

FWP states that "Forty-three percent (n = 42 respondents) reported "social issues" (e.g., too many people, congestion, crowding, conflicts, etc.) as being their primary reason. For purposes of this study, these respondents were identified as being displaced due to social reasons."

- **The survey was administered to 1,927 people. A total of 732 responded to the survey. Of 732, only 97 responded to the question "what was your primary reason for NOT fishing the Madison.**
- **Of the 97 respondents to that question, 42 responses were classified by FWP as "social issues" not by the respondents.**
- **Only 26 responses said there were too many people, 13 said they were too busy or not enough time, and 12 said they moved away from the river. These were the 3 greatest frequencies of responses, the remaining 24 responses had less than 5% frequency. However, FWP continually states that 43% of people do not fish the Madison any more due to social issues. Again, the term "social issues" was NOT the respondents answer, but "social issues" was the classification applied to the respondents' answers by FWP authors.**
- **This is a widely cited survey by FWP and others, as such it is important to look closely at the number of responses, not just the percentages reported. For example, the greatest number of responses to various conditions in the question "In your opinion, how acceptable or unacceptable are the following conditions on the part of the Madison River between Lyons Bridge to Ennis Dam?" was 25 to 45 (page 6). From Ennis Dam to Three Forks the greatest number of respondents was 87 (page 7). It is important to remember, these were the number of self-selected respondents to 1,927 surveys sent out and only 732 returns.**

Part II. Results from Displaced Resident Anglers is also a widely-cited potion of this survey by FWP and others.

- **All percentages based on this portion of the report it is based entirely from 143 respondents that reported they previously fished the Madison River, at one time considered themselves to**

be regular/frequent user of the Madison River, and fished the Madison river for the first time more that 3 years ago.

- **Again, remember these were the number of respondents to 1,927 surveys sent out and 732 returns.**
- **Further, of these 143 responses, 27 respondents reported that the reason was because of too many people in general, only 5 said too many outfitters, only 4 said too many boats, only 3 said too many anglers, 2 said too many floaters, only 1 said there is too much fishing pressure.**

Summary of research, Selected findings from a survey of resident anglers concerning the Madison River in Montana, April 2009.

This FWP report summarizes and uses the exact same data as the previous report. This report is distributed by FWP under a different title and format. None of the data were changed, simply the presentation. The vague unquantified are reiterated in the Discussion section. For example, FWP reports:

> "That said concern was expressed some angling related conditions during the summer (June 15 to September 30). A *moderately high percentage* of respondents to the survey rated at least some conditions on the river as being unacceptable during this time period. Conditions that were related most unacceptable during the summer included the number of people (and their vehicles) at river access points, the number of people float fishing the river, and the number of people floating the river for recreational purposes other than fishing (especially on the lower river)."

- The greatest number of respondents and greatest percentage of these conditions was 57% or 70 respondents.

Angler satisfaction, demographic, and creel surveys – upper Madison River, 2015 – 2017.

- Figure 2, page 5. This Figure presents angler days per year derived from mail in surveys collected during odd-numbered years. This graph points out that from 2011 to 2017 angler-use numbers on the Madison River went from about 90,000 to 207.000.
- Tables 1 and 2, page 8. These are two of the most accurate numbers presented by FWP in all the information provided to us. Table 1 presents average number of guided boats per day by month for 2015 to 2017 just downstream from Lyon's Bridge. Average number of boats per day per month were 12, 34, 93, 62, 47, and 14 for May through October, respectively.
- Table 2 presents average percentage of guide boats per day out of all boats by month for 2015 to 2017 just downstream from Lyon's Bridge. Average percentage of guide boats per day per month were 35%, 61%, 61%, 68%, 71%, and 53% for May through October, respectively.

2016 Mail-in survey

The data presented in Figures 4 and 5 reports the percentage of the range of responses from respondents from very unacceptable to very acceptable across a series of conditions on the Madison River. While response rates were good, 2,921 responses out of 5,792 sent (50.4%), response rates are only presented for the very unacceptable or unacceptable portion of the ranges.

FWP reports that the combined unacceptable and very unacceptable score for the number of people (and their vehicles) at river access points scored a combined 59.8% for residents and 36% for non-residents.

- **However, what was failed to be reported was that correspondingly, those same numbers account for 40.2% very acceptable or acceptable score and 64% very acceptable score.**

Madison River: Draft recreation management plan – Environmental Assessment, April 2018.

- Page 4: "Surveys conducted by FWP in 2008, 2009, 2012, and 2016 provide insight into how satisfied people were with their Madison River experience." **This statement perpetuates many of the biases demonstrated in those surveys.**
- Page 4: "Notably absent from this draft management plan is any proposal to manage the heavy tuber use which occurs between Warm Springs Recreation Area and Black's Ford Fishing Access Site during July and August on the lower Madison River. FWP did not address this demographic in this draft management plan because warmer water temperatures during July and August create a scenario on the lower Madison River that results in minimal angling effort during peak tuber use. In addition, angling is typically restricted through hoot owl closures during these months to protect the fishery during this period of high water temperature." So, based on these statements, **high tuber use (as much as 750,000 user-days during 2017; BLM pers. Comm.) during summer does not impact the fishery enough to warrant recreation management? We do not concur.**
- **Impacts on the fishery during warm water from angling or disturbance from floating can adversely affect the fishery that warrants managing this demographic, especially during times of the year (summer) when fisheries are more stressed because of warmer water temperatures. Further, because angling is restricted via hoot owl closures, does not warrant omitting that section from a recreation management plan.**
- Page 4. "In addition to survey information, FWP also received informal public input regarding the Madison River. Several themes emerged, including a consistent message that the number of users and vessels on the water and at access sites has created social conflicts and led to the displacement of some Madison River users, especially among Montana residents." **However, none of these comments were enumerated or cited for reference and confirmation.**
- Page 6, Figure 1. This figure presents total angler days gleaned from mail-in surveys collected on odd years for the upper Madison River. **Angler day estimates for 2016 were estimated at 175,000 angler days (207,000 for 2017); yet nowhere in the EA draft document are managing these use numbers addressed.**
- Page 7. "In 2016, FWP implemented season-long fishing on the entire upper Madison River in an effort to provide uncrowded opportunity for resident anglers and spread-out use during the

spring. The newly liberalized regulations have lead to increases in spring outfitter use of previously closed sections of the upper Madison." **While this statement is true, the liberalized regulations also lead to an increase of total angler use in spring because this section was closed to fishing prior to 2016.**

- Page 7, Table 1. **While total angler use days on the upper river were reported to be as great as 175,000 during 2016, nowhere in the draft EA were commercial trips by year (20,018 user days on the upper river) represented as a percentage of that number, which is only 11.4%.**
- Page 8. "The reach from Quake Lake to Lyons Bridge has nearly doubled in outfitter use since 2013 while the reach from Ennis FAS to Ennis Lake has increased by over 350%." **This is an example of FWP bias against outfitters by reporting only percentages and not the actual use numbers. While the number of trips did double, total number of trips in this section during 2017 was 542, representing only 4.64 % of all outfitted trips on the Madison.**
- Page 8. "Using vessels or float tubes to gain access for fishing in these reaches [Ennis to Ennis Lake], not just by outfitters, is a major source of contention for wading anglers, which is evidenced both by consistent volunteered public comments and through angler satisfaction surveys." **Again, this is data presented that is neither enumerated or cited such that the comments can be referenced or verified.**
- Page 9. "In general, landowners indicated that conditions on the river were acceptable regarding recreational use, with the notable exceptions of the high incidence of trespassing and the large number of float fishermen from Lyons Bridge to Ennis Lake during the summer. Landowners also expressed concern regarding negative effects to the fishery due to higher levels of recreational use." **Just as pointed out in referenced reports, FWP is using low actual numbers of respondents or anecdotal information to demonstrate their point. This type of information is not enumerated or cited or verifiable.**
- Page 9. "Forty-three percent of those who no longer fished the Madison River indicated they no longer fished there because of river congestion, crowding or other user conflicts." **A perfect example of using percentages to misrepresent actuality. The actual numbers are 43% or 42 self-selected respondents of 143 respondents of 731 total respondents to a survey that was sent to only 1,927 people.**
- Page 9. "In the upper reach from Quake Lake to Lyons Bridge FAS most individuals reported that river conditions in this reach were acceptable, but there was concern with the number of people and vehicles in access sites and the number of people recreating along this reach of the river. From Lyons Bridge FAS to Valley Garden FAS the river conditions were again considered by most respondents to be acceptable. However, some of those surveyed indicated they were concerned with the number of encounters with other recreationists on the river, the number of people and vehicles at access sites, and the amount of visitor impact to the natural resources." **Again, FWP is using vague modifiers, most, many, etc., or anecdotal information as evidence to support their point. However, this type of information is neither enumerated nor cited nor verifiable.**
- Page 44. "Prohibiting the use of a vessel or float tube to gain access to fishing in wade-only reaches would likely not have a significant impact on natural resource values unless it resulted in an increase in wade angling. If wade angling increased overall or in specific locations, increased disturbance and erosion could occur." **Representative contradictory sentences, certainly if boats were prohibited from above Lyon's Bridge, wading would necessarily increase. As such,**

increased wade angling would increase disturbance and erosion would occur as well as degraded riparian areas.

- Page 44. "Prohibiting commercial use between Greycliff FAS and the confluence with the Jefferson River will retain the current natural resource values in this reach of the Madison River." **This section of the river receives the least amount of commercial use currently, 0.61% of all outfitted trips or a total of 71 trips occurred in this section. FWP needs to demonstrate how prohibiting less that 100 outfitted trips per year affects any current natural resource value. Perhaps citing literature or providing evidence where FWP obtained their data that shows commercial users detract or degrade natural resource values would be valuable to this statement.**

DISCUSSION

Many of the studies presented by Fish, Wildlife & Parks (FWP) biologists to the Madison River Negotiated Rulemaking Committee (NRC) consist of surveys of river users, anglers, or land owners or angler surveys often employed to assess levels of angler satisfaction or attempt to identify issues and areas of angler or land owners. Properly administered surveys can accurately assess social conflict issues inexpensively, they can cover a wide audience, and are often flexible with regard to opportunity for respondents to take their time to assess questions and respond at their convenience. However, survey sampling bias in administered surveys is widespread and often unrecognized by those administering the surveys unless surveyors are specialists in survey composition and administering.

Bias in surveys

- Undercoverage bias. Bias often occurs when the survey sample does not accurately represent the population. The bias that results from an unrepresentative sample is called selection bias. Undercoverage occurs when some members of the population are inadequately represented in the sample. Undercoverage is often a problem with convenience samples (those persons surveyed because the surveyor was present).
- Nonresponse bias. Sometimes, individuals chosen for the sample are unwilling or unable to participate in the survey. Nonresponse bias is the bias that results when respondents differ in meaningful ways from nonrespondents. Response rate is often low, making mail surveys vulnerable to nonresponse bias.
- Voluntary response bias. Voluntary response bias occurs when sample members are self-selected volunteers, as in voluntary samples. The resulting sample tends to overrepresent individuals who have strong opinions.
- Order bias. The order you ask questions matters. Mentioning products, brands, or events can affect how people rate their familiarity and attitudes on subsequent questions. A respondent might remember a choice that appeared in an earlier question and be more likely to select the response on later questions. You can often manage many order effects through properly sequenced questions and randomization.
- Prestige bias. Respondents will likely round up on income (especially men), education, and their reported power and prestige when making decisions. If a question asks about prestige, assume the responses are inflated to present the respondent in a more favorable light. Exactly how much they are inflated will depend on the question, context and respondents.

- Sponsor bias. When respondents know where the survey is coming from (the sponsor), it will likely influence responses. One of the best ways to minimize sponsorship bias is to obfuscate the sponsor as much as possible or use a third-party research firm.
- Stereotyping bias. Asking about gender, race, technical ability, education, or other socio-economic topics may reinforce stereotypes in the mind of the respondents and may even lead them to act in more stereotypical ways. For example, reminding people that stereotypes exist around those who are more technically averse (age), math ability (gender), or intelligence (education level) may affect later responses as the stereotype primes respondents through the questions.
- Memory bias. Getting people to think about unpleasant things and events can get them in the wrong state of mind, which can cast a negative shadow on subsequent questions. Studies have shown getting people in a hostile mindset will affect their attitudes, and consequently survey responses. Memories are malleable and in general, we are not terribly good at remembering events accurately. People tend to distort their memories to match current beliefs, also called telescoping. Respondents may recall an event but report that it happened earlier than it actually did (backward telescoping) or report that it happened more recently (forward telescoping). Many research questions rely on participants to recall specific events or behavior. There can be a tendency to recall events that didn't happen or forget the specifics of an event.

The above cited studies presented to the Madison River NRC by FWP as background materials such that they can make informed management decisions on a new Madison River Recreation Plan. All too frequently however, sample sizes of survey respondents were relatively low compared to the estimated 207,000 angler days on the upper Madison River and estimated 750,000 user-days on the lower Madison River. If user days on the Madison River are that extensive, then survey response sample sizes would be expected to be larger. Further, if user satisfaction on the Madison River has been increasing over the last eight years, why are angler- and user-days increasing at an increasing rate over the last eight years?

While FWP often cites their Human Dimensions Unit as an author on many of the surveys presented to the NRC; the surveys were often administered by FWP biologists without expertise in survey design and sampling protocols necessary for valid social science interpretations.

For example, a statement often cited by FWP

> "Forty-three percent of these "formerly avid resident anglers from the past" said their primary reason for no longer fishing there [Madison River] or infrequently fishing there now was due to "social" issues such as congestion, crowding, or user conflicts."

is based on responses from only 42 people. Further, if 43% of people no longer fish the Madison, how has angler use on the upper Madison River increased from 89,000 angler-days in 2011 to 207,000 angler-days in 2017?

While, I am not attempting to interpret data that favors outfitters or commercial use in general, I am advocating for accurate, verifiable and statistically robust user data that accurately reflects current use on the Madison River. Outfitters regularly expect to have regulations imposed on them; however, these regulations need to be based on accurate user information across all user groups. Regulations applied

based on inaccurate user data can lead to harmful economic implications for local communities and may have little effect on managing use across the Madison.